

```

1
2      title "Clock process"
3
4      ;*****
5      ;*
6      ;*      CLOCK RSP
7      ;*
8      ;* The clock process will update the CCP/M-86 time of
9      ;* Day structure each time it returns from waiting for
10     ;* the "Second" System Flag (Flag 2). When the minute
11     ;* is updated, the "minute" flag is set (Flag 3).
12     ;*
13     ;*****
14
15     ; ccpm functions
16
17     00E0      ccpmint      equ      224      ; ccpm entry interrupt
18     0084      dev_flagwait equ      132      ; flagwait
19     0085      dev_flagset  equ      133      ; flagset
20
21     0068      rlr          equ      68h      ; Ready List Root
22
23     0028      xiosentry    equ      28h      ; offset of double word pointer in
24     ; the system data segment of XIOS entry
25     0008      io_statline  equ      8        ; update XIOS status line
26
27     007E      tod_offset   equ      07Eh
28     0002      sec_flag     equ      2
29     0003      min_flag     equ      3
30
31     ; TOD format
32
33     0000      tod_day       equ      word ptr 0
34     0002      tod_hour     equ      byte ptr 2
35     0003      tod_min      equ      byte ptr 3
36     0004      tod_sec      equ      byte ptr 4
37
38     ; PD fields
39
40     0010      p_uda        equ      10h      ; offset of UDA segment in PD
41     0030      pdlen        equ      48      ; length of process descriptor
42
43     0000      ps_run       equ      0        ; PD run status
44     0002      pf_keep      equ      2        ; PD nokill flag
45
46     ; RSP format
47
48     0000      rsp_top      equ      0        ; rsp offset
49     0010      rsp_pd       equ      010h     ; PD offset
50     0040      rsp_uda      equ      040h     ; UDA offset
51     0140      rsp_bottom   equ      140h     ; end rsp header
52
53     ;*****

```

CCP/M-86 2.0 V.2
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 SER. # CC-104

```

54
55      ;*
56      ;*   CLOCK CODE SEGMENT
57      ;*
58      ;*****
59
60      cseg
61      org      0
62
63
64      0000 CDE0C3      ccpm:   int ccpmint 1 ret
65
66      clock:           ; Clock process starts here
67
68      0003 8E1E0000      mov ds,sydat
69      0007 8B3668008E44  mov si,r1r 1 mov es,p_uda[si] ; ES is never saved.
70      10
71
72                                     ; Note if other ccpm system calls
73                                     ; are added to this program, ES
74                                     ; may be changed.
75
76      000E BB7E00      mov bx,tod_offset
77
78                                     ; Loop forever
79      clockloop:
80                                     ; BX -> TOD structure in SYSDAT
81                                     ; Wait for Seconds Flag
82      0011 B98400BA0200  mov cx,dev_flagwait 1 mov dx,sec_flag
83      0017 53           push bx
84      0018 E8E5FF      0000  call ccpm
85
86                                     ; Call XIOS status line update.
87                                     ; ES=UDA, DS=system data segment
88      001B B80800      mov ax,io_statline
89      001E 33C98BD1    xor cx,cx 1 mov dx,cx
90      0022 FF1E2800    callf dword ptr .xiosentry
91
92      0026 5B           pop bx
93
94                                     ; increment seconds
95      0027 F8           clc
96      0028 8A4704      mov al,tod_sec[bx]
97      002B FEC027884704 inc al 1 daa 1 mov tod_sec[bx],al
98
99                                     ; check for minute mark
100      0031 3C607303    0038  cmp al,60h 1 jae update_min
101      0035 E9D9FF      0011  jmp clock_loop
102
103      update_min:
104                                     ; set minute flag
105
106      0038 C6470400      mov tod_sec[bx],0
107      ;                 mov cx,dev_flagset 1 mov dx,min_flag

```

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107
108           ;      push bx i call ccm i pop bx
109
110           ; increment minute field of tod
111
112 003C F88A4703      cld i mov al,tod_min[bx]
113 0040 FEC027884703  inc al i daa i mov tod_min[bx],al
114
115           ; check if hour
116
117 0046 3C607303      004D      cmp al,60h i jae update_hour
118 004A E9C4FF        0011      jmp clock_loop
119
120           update_hour:
121           ; update hour field
122
123 004D C6470300      mov tod_min[bx],0
124 0051 F88A4702      cld i mov al,tod_hour[bx]
125 0055 FEC027884702  inc al i daa i mov tod_hour[bx],al
126
127           ; check for day
128
129 005B 3C247303      0062      cmp al,24h i jae update_day
130 005F E9AFFF        0011      jmp clock_loop
131
132           update_day:
133           ; update Day field
134
135 0062 C6470200      mov tod_hour[bx],0
136 0066 FF07          inc tod_day[bx]
137 006B E9A6FF        0011      jmp clock_loop           ; loop forever
138
139 *****
140 ;*
141 ;*      Data Segment
142 ;*
143 *****
144
145           dseg
146           org      0
147
148 0000 000000000000  sysdat  dw      0,0,0
149 0006 000000000000      dw      0,0,0
150 000C 00000000      dw      0,0
151
152           org      rsp_pd
153
154 0010 00000000      dw      0,0           ; link,thread
155 0014 00          db      ps_run        ; status
156 0015 BE          db      190           ; priority
157 0016 0200        dw      pf_keep       ; flags
158 0018 434C4F434B20 db      "CLOCK "           ; name
159 2020

```

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```

160
161 0020 0400          dw  offset uda/10h ; uda seg
162 0022 00000000      db  0,0,0,0      ; dsk,usr,lclk,luser
163 0026 0000          dw  0              ; mem partitions
164 0028 00000000      dw  0,0          ; dvact,wait
165 002C 0000          db  0,0          ; org,net
166 002E 0000          dw  0              ; parent
167 0030 00000000      db  0,0,0,0      ; cns,abort,cin,cout
168 0034 00000000      db  0,0,0,0      ; lst,sf3,sf4,sf5
169 0038 000000000000 dw  0,0,0,0      ; reserved,pret,scratch
170 0000
171
172          org      rsp_uda
173
174 0040 000000000000      uda  dw  0,0,0,0      ;0-7 note: no default DMA
175 0000
176 0048 000000000000      dw  0,0,0,0      ;8-fh
177 0000
178 0050 000000000000      dw  0,0,0,0      ;10-17
179 0000
180 0058 000000000000      dw  0,0,0,0      ;18-1f
181 0000
182 0060 000000000000      dw  0,0,0,0      ;20-27
183 0000
184 0068 000000000000      dw  0,0,0,0      ;28-2f
185 0000
186 0070 000000003A01      dw  0,0,offset stack_top,0 ;30-37
187 0000
188 0078 000000000000      dw  0,0,0,0      ;38-3f
189 0000
190 0080 000000000000      dw  0,0,0,0      ;40-47
191 0000
192 0088 000000000000      dw  0,0,0,0      ;48-4f
193 0000
194 0090 000000000000      dw  0,0,0,0      ;50-57
195 0000
196 0098 000000000000      dw  0,0,0,0      ;58-5f
197 0000
198 00A0 01              db  1              ;60 INSYS <> 0
199
200
201
202          db  0
203
204 00A2 CCCCCCCCCCCC      dw  0cccc,0cccc,0cccc      ;62-67
205 00A8 CCCCCCCCCCCC      dw  0cccc,0cccc,0cccc,0cccc ;68-6F
206 CCCC
207 00B0 CCCCCCCCCCCC      dw  0cccc,0cccc,0cccc,0cccc ;70
208 CCCC
209 00B8 CCCCCCCCCCCC      dw  0cccc,0cccc,0cccc,0cccc
210 CCCC
211 00C0 CCCCCCCCCCCC      dw  0cccc,0cccc,0cccc,0cccc ;80
212 CCCC

```

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```

213
214 00C8 CCCCCCCCCCCC      dw      0cccc,0cccc,0cccc,0cccc
215      CCCC
216 00D0 CCCCCCCCCCCC      dw      0cccc,0cccc,0cccc,0cccc      ;90
217      CCCC
218 00D8 CCCCCCCCCCCC      dw      0cccc,0cccc,0cccc,0cccc
219      CCCC
220 00E0 CCCCCCCCCCCC      dw      0cccc,0cccc,0cccc,0cccc      ;A0
221      CCCC
222 00E8 CCCCCCCCCCCC      dw      0cccc,0cccc,0cccc,0cccc
223      CCCC
224 00F0 CCCCCCCCCCCC      dw      0cccc,0cccc,0cccc,0cccc      ;B0
225      CCCC
226 00F8 CCCCCCCCCCCC      dw      0cccc,0cccc,0cccc,0cccc
227      CCCC
228 0100 CCCCCCCCCCCC      dw      0cccc,0cccc,0cccc,0cccc      ;C0
229      CCCC
230 0108 CCCCCCCCCCCC      dw      0cccc,0cccc,0cccc,0cccc
231      CCCC
232 0110 CCCCCCCCCCCC      dw      0cccc,0cccc,0cccc,0cccc      ;D0
233      CCCC
234 0118 CCCCCCCCCCCC      dw      0cccc,0cccc,0cccc,0cccc
235      CCCC
236 0120 CCCCCCCCCCCC      dw      0cccc,0cccc,0cccc,0cccc      ;E0
237      CCCC
238 0128 CCCCCCCCCCCC      dw      0cccc,0cccc,0cccc,0cccc
239      CCCC
240 0130 CCCCCCCCCCCC      dw      0cccc,0cccc,0cccc,0cccc      ;F0
241      CCCC
242 0138 CCCC              dw      0cccc
243
244 013A 0300      stack_top      dw      offset clock      ; code starting point
245 013C 0000              dw      0      ; code seg - set by GENSY
246 013E 0000              dw      0      ; init. flags - set by GENSY
247
248                      ; UDA is 100h bytes long
249                      end
250
251
252 END OF ASSEMBLY.  NUMBER OF ERRORS:  0.  USE FACTOR:  2%

```

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CCPM	0000 L	64#	82			
CCPMINT	00E0 N	17#	64			
CLOCK	0003 L	66#	244			
CLOCKLOOP	0011 L	77#	100	118	130	137
CS	SREG V					
DEVFLAGSET	0085 N	19#				
DEVFLAGWAIT	0084 N	18#	80			
US	SREG V	68				
ES	SREG V	69				
IOSTATLINE	0008 N	25#	86			
HINFLAG	0003 N	29#				
POLN	0030 N	41#				
PFKEEP	0002 N	44#	157			
PSRUN	0000 N	43#	155			
PUDA	0010 N	40#	69			
RLR	0068 N	21#	69			
RSPBOTTOM	0140 N	51#				
RSPPD	0010 N	49#	152			
RSPTOP	0000 N	48#				
RSPUDA	0040 N	50#	172			
SECFLAG	0002 N	28#	80			
SS	SREG V					
STACKTOP	013A V	186	244#			
SYSDAT	0000 V	68	148#			
TODDAY	0000 N	33#	136			
TODHOUR	0002 N	34#	124	125	135	
TODMIN	0003 N	35#	112	113	123	
TODOFFSET	007E N	27#	74			
TODSEC	0004 N	36#	94	95	105	
UDA	0040 V	161	174#			
UPDATEDAY	0062 L	129	132#			
UPDATEHOUR	0040 L	117	120#			
UPDATMIN	0038 L	99	102#			
XIOENTRY	0028 N	23#	8d			

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